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U. S. Department of Agriculture

# CACTI AND SUCCULENTS

*And how to grow them*

COOVER'S CACTUS COLLECTION

2018 South Summerlin

Orlando, Florida

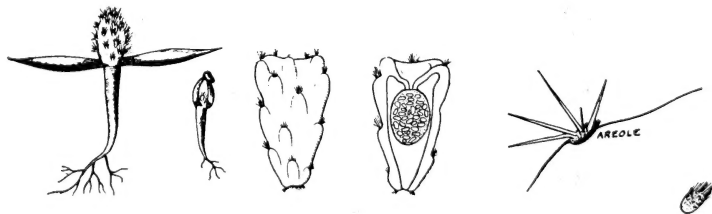


## WHAT ARE CACTI AND SUCCULENTS?

Plants known as succulents can be briefly described as those which are capable of surviving long periods of drought. They usually possess fleshy or succulent moisture-storing leaves, stems, or tubers. In many of the plant families, or groups having similar characteristics, one may find one or more of that broad classification which we call succulents. For instance, all of the plants in the Cactus Family are succulents but it is well to keep in mind that *all* succulents are not cacti. That is why we say "cacti and the *other* succulents" when we want to be technically correct.

Your next question may then be, "Then a cabbage is a succulent, is it not?" You can eliminate it because it will not stand the following tests: 1. Can you up-root a growing plant, lay it aside for several months and then replant it? 2. Can you withhold moisture for a period of time without injury to the plant? Of course you can store a cabbage for a single season but while it is in the ground it must have water. In other words, it is the degree of drought resistant qualities which is so much greater in succulents than in other plants.

To many people a plant with a "sticker" is a cactus, yet we can show you cacti with true leaves, cacti without spines, succulents with vicious spine-like organs, and succulents with practically the same



### QUALIFICATIONS OF A CACTUS

Cacti are perennials. Seedlings of a cactus must have two or more seed-leaves (early leaves) as shown on the left. A cactus fruit showing the one-celled "berry" with no cell divisions between the seeds (center) the flowers are borne above the fruit. All cacti have areoles (shown on the right) from which spines, leaves (when present), new joints, and flowers grow.



bizarre form as cacti. The most characteristic requirement of a cactus is the so-called "areole" which is a point of growth, often a slight depression, usually bearing fine short hairs (glochids), bristles or spines, long hair or wool, or one or more of the foregoing. A brief survey of your plants will clearly show the difference and you will have mastered the first step in knowing them.



The cactus with true leaves is called the Lemon Vine (*Pereskia aculeata*) and has areoles and spines. The flowers resemble a wild rose and the fruit is yellow like a lemon. Very few of the cacti have leaves.

In talking about your cacti you may wonder which is correct, cactus or cacti. When speaking of one plant use "cactus," and when speaking of several, use "cacti" (pronounced kăk'-tie): Often, in the titles of books the singular is used because "cacti" is less familiar to the beginning than the word "cactus." Try to avoid such glaring errors as "cacti collection;" you wouldn't say "apples collection." However, the reverse is also correct when you say "collection of cacti" and not collection of apple" or "collection of cactus."

Spend two minutes and think out these three simple basic statements: 1. What is a succulent? 2. What is a cactus? 3. When do you use the plural form "cacti"?

## SUCCULENT NAMES

Many a would-be cactus fan is frightened away from this hobby because of the tongue-twisting names of the plants. It is true that a person enjoys a plant more if he can call it by name—unfortunately the cactus isn't always where you can point to it when discussing it. And there is even a greater satisfaction if a grower can gurgle the scientific names, if it's only to astonish admiring friends!

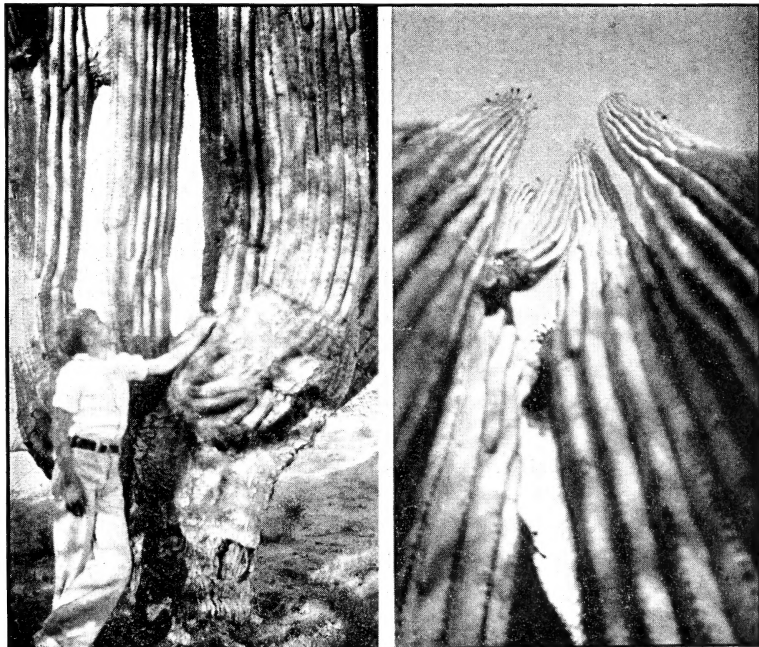
The average beginner will start with the common names and use them until he finds that his collection has enlarged to the point where he must use scientific names in ordering new plants. The objection to common names is that the *same* name may be used in different localities for *different* plants, with the result that if you use common names when buying you may have several plants alike but with various names. On page 59 we have listed the best known common names in the hope that all dealers will attach them to the plant designated. In this book we have used common names as much as possible.

In the meantime use the common names and enjoy your plants but try to master the scientific terms, especially for the main groups called "genera" (genus when speaking of one group). If you have not acquired a pronouncing dictionary for succulent terms, say them anyway—you will get them as nearly correct as your friends!

For classification, all plants have two names the same as individuals. The surname of a person tells the family to which he belongs while the given name indicates the particular individual in that family. In plant names the order is reversed. For example, in *Mammillaria elongata*, the word *Mammillaria* denotes a group of closely related plants (corresponding to the family or surname), while the second name refers to a specific plant named and described as *elongata* (corresponding to the given name).

## WHERE SUCCULENTS ARE FROM

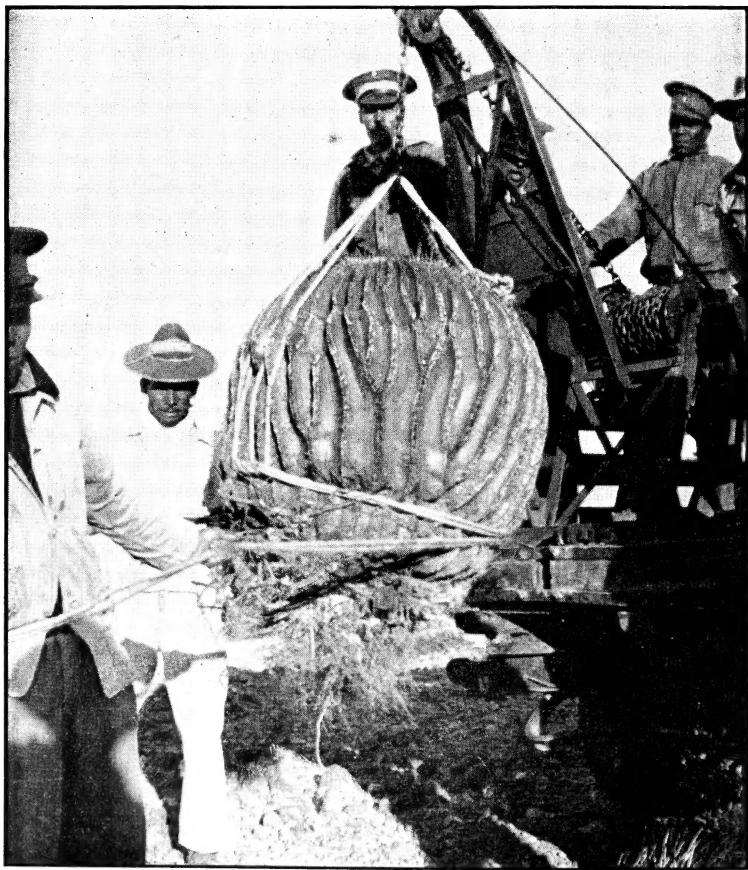
The thousands of plants known as succulents\* include those strangely unique forms which, through evolution, have adapted themselves to resist or survive long periods of drought. Most cacti, in the distant past, had leaves and flourished as do other plants



Do not try to grow the Giant Cactus of Arizona (*Carnegiea gigantea*) on your window ledge. It would take you a hundred years to get a flower and there are many other kinds which are better suited to cultivation.

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\*From now on "succulents" will include cacti. The "other succulents" will exclude cacti.



Moving a big Barrel Cactus in the state of Hidalgo, Mexico. This *Echinocactus ingens* may be heading for the cactus candy factory where a worthless product claims a high mortality of our fine desert plants.

living under conditions where extremes of dryness are not as pronounced. As certain areas became hotter and dryer these plants changed their forms and the leaves were modified into thickened bodies hardly recognizable as leaves. Many plants gave up their leaves altogether and the leaf functions were transferred to swollen stems and were replaced by defensive spines or other protective covering. By reducing the leaf surface, the moisture usually given off was reduced to a minimum. The plant bodies became covered with a waxy coating, hairs, and other specialized evaporation resisting coverings for the conservation of moisture until the next rains, which were readily absorbed and retained through the dry seasons.

Succulents are found in many plant families growing in all parts of the world, from high barren mountain slopes to arid wastes. Whereas most of the other succulents are found in Africa—though also in many other countries—most cacti are native of the Americas.

Cacti range in size from the Giants of Arizona weighing tons to the Button Cactus the size of a penny. The other succulents, too,



LEFT: One of the smaller cacti—*Rebutia minuscula*. RIGHT: Of the other succulents, the evening flowering *Stomatium fulleri* is thumb-size.

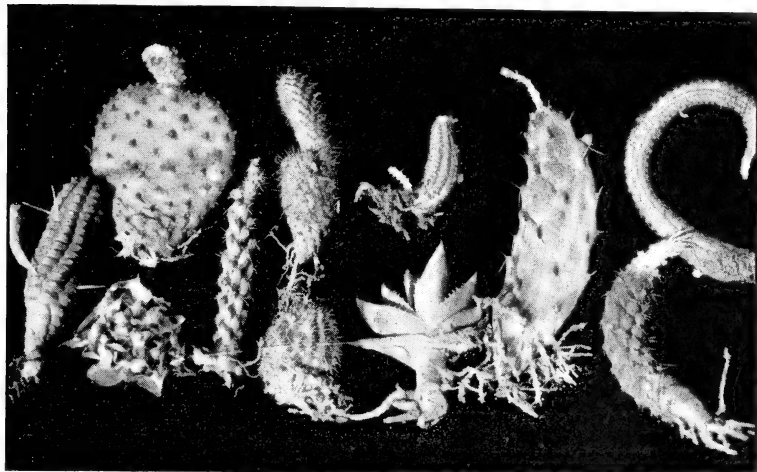
have the same extremes, varying in size from tiny bead-like Sedums to tree-like Euphorbias, while flowers of the Century Plant reach thirty feet into the sky. The diversified forms are interesting for themselves but the beautiful flowers are beyond description. Anyone is challenged to obtain a few plants and to enjoy the thrill of seeing



The Easter Lily Cactus (*Echinopsis*) is one of the finest flowering cacti.

the contrasting beauty which can be found in no other forms of plant life.

The growing of succulents has long passed the stage of a fad. They have become well-known throughout the world where they thrive and respond to careful treatment, thus proving that they are not living in arid deserts because they want to, but from necessity.



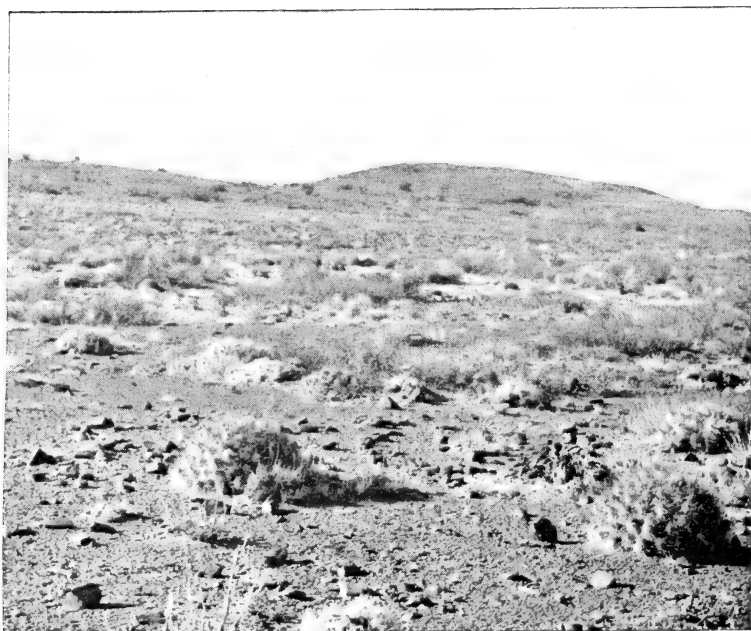
This collection of plants boxed for sale contained 1 dead plant (the *Sempervivum*, second from the left in the bottom row). The plants were also infested with mealy bugs and scale and most of the plants had made an unhealthy, colorless, stringy growth called etiolation. Buy healthy plants.

## CULTURAL DIRECTIONS

When you buy plants, whether they come from a store display or through the mail, they are more tender from lack of sunlight than when they were removed from the field or from a growing house. The roots have been disturbed and have a tendency to rot if watered too freely. Or the growing center has started to lose its color and is easily burned if subjected to direct sun. Follow instructions carefully to get them re-established and then healthy growth will result.

Cacti and the other succulents may be rooted in sand but they never grow in pure sand as is sometimes believed. They must have food or they will become yellow and die. Even the arid desert regions are rich in decomposed vegetation which becomes quickly

available as plant food with the first rains. Succulents, in their native home, rarely have animal fertilizers of any kind and depend on leaf mold and minerals. In cultivation it is difficult to supply the varied soils for the different plants and the deficiencies are often balanced by the use of plant foods. Well established plants or plants grown out of doors seem to respond to a weak solution of liquid manure or a top dressing worked into the soil. Do not feed plants during their dormant or resting period.



The deserts are rich in leaf mold and following the rains they are carpeted with flowers. The South African deserts, especially, grow most of our other succulents. Deserts do not necessarily mean sand and camels!



### Soil Mixture

A knowledge of where the plants are from will furnish a clue as to the proper soil mixture, amount of water, and the required exposure to the sun. A basic soil mixture consists of:

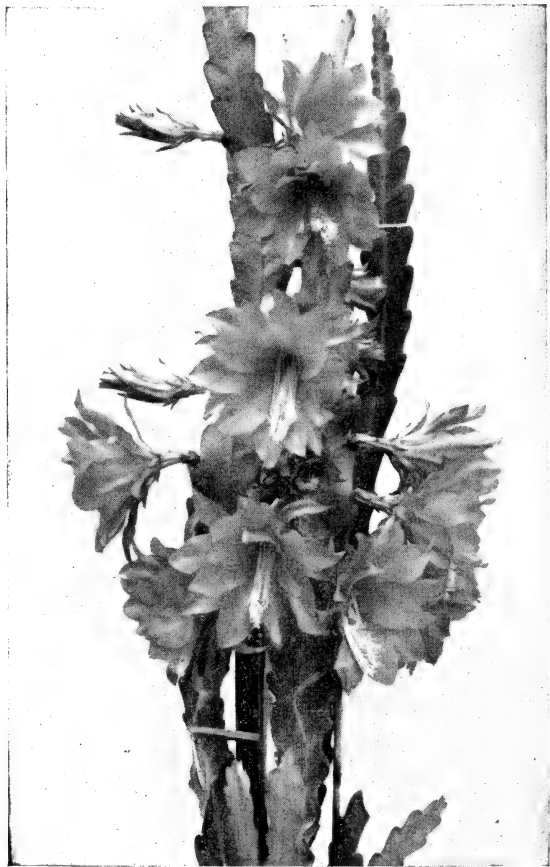
- 1 part garden loam
- 1 part leaf mold, well decomposed
- 1 part coarse sand (not beach sand)
- poultry charcoal and old mortar (crushed)

When in doubt use this standard mixture and then as you gain experience you may vary the soil to the requirements of the different plants. The greatest trouble is to get matured soil and not that which is in the process of decomposition. Leaf mold that is not thoroughly decayed—that is, two or three years old—may give trouble by creating an acid condition which may infect the roots and cause them to develop rot. Coarse leaf mold invites infestation of root mealies. Sooner or later, most every collector will experience the sad results of root mealies unless precaution is used; we have seen whole collections ruined before this pest was discovered.

There are a few exceptions in cacti that will thrive on an acid soil. These plants are from the tropical areas where they live in trees and feed from the pockets of decaying vegetable matter. Such plants as Chain Cactus (*Rhipsalis*), Orchid Cactus (*Epiphyllums*), and Rat Tail Cactus (*Aporocactus*) may safely be planted in a mixture of:

- 4 parts leaf mold
- 2 parts peat moss
- 3 parts cow or sheep manure
- 2 parts gravel
- 2 parts sharp, washed sand not too fine

The main requirement of the soil for all succulents, including cacti of course, is that it shall be porous. If water penetrates the soil immediately and does not stand in the pot, then it is sufficiently porous. The garden loam gives consistency to the mixture and prevents too quick drying of the soil. Most of the cacti welcome more lime than the other succulents and this can be obtained from old plaster walls. Charcoal from a poultry feed store also tends to prevent a sour soil and helps to keep it porous.



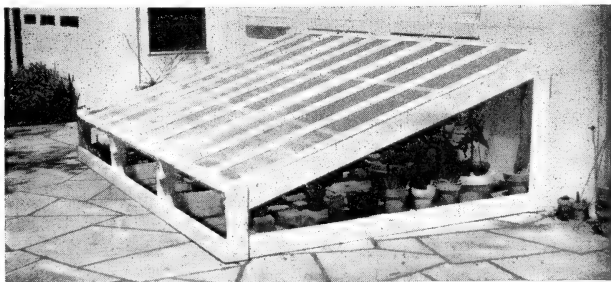
The Orchid Cacti (*Epiphyllums*) are practically without spines. These plants are native to the humid jungles where they grow in pockets of leaf mold which have become lodged in trees. Give these plants a richer soil mixture, more water, and protect from direct sun so that their leaves do not turn yellow.

## SUN AND AIR

Sun and air are as important as soil conditions for the successful growth of healthy plants. The majority of succulents are sun worshippers and are accustomed to long periods of dry heat. Desert plants transplanted to gardens where heavy fogs prevail soon lose their beautiful spine coloring and become blackened. Glasshouse culture can sometimes preserve their native appearance, but overwatering is always a great temptation.

While most succulents need plenty of light, not all of them enjoy full exposure to a burning sun all day. Some types such as the Orchid Cacti (*Epiphyllums*) and some of the Houseleeks (*Sempervivums*) thrive in partial shade but never in a north window.

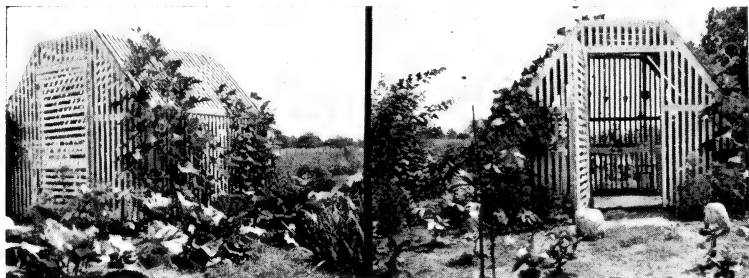
Because of the limited root system, many cultivated plants cannot stand the direct rays of the sun without some protection. Desert plants, especially the cacti, are often heavily spined and therefore can better resist strong sun but under glass divided light and shade are needed. Sunburn is recognized by the yellow or white coloring



A lean-to frame protects the plants from cold and hard rains.  
The sash can be raised to permit plenty of fresh air.

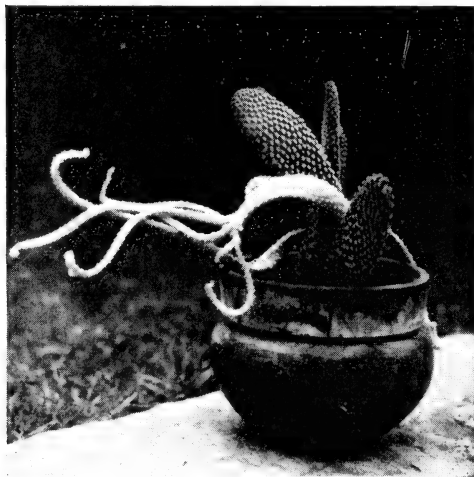
which is always localized on the top or south side of the plant. Brown spots or scabs then develop that disfigure the plant.

When plants are kept too dark they produce abnormal growth and become elongated and colorless and when grown in full shade are



An inexpensive lath house permits air and sunlight during summer months.

more susceptible to diseases and do not flower. The plants should be turned frequently to equalize the sunlight; however, after the buds have set, do not turn the pot or the buds will drop off. After the buds have set, be sure to maintain the same amount of watering and do not spray the flower buds.

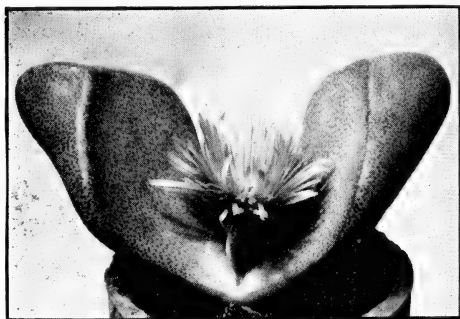


Stringy, whitish growth is frequently seen in cactus bowls which do not have sufficient sun light. The Bunny Ears (*Opuntia microdasys*) has golden glochids (minute spines) which are extremely irritating.

## WATER AND REST

As a rule, potted succulents may be watered often throughout the summer months after which they should be lightly watered each month to keep the roots from drying out. Desert types should be segregated so that they will receive less water. It is always best to give the plants a thorough watering and then allow them to become nearly dry before watering again. Roots allowed to become too dry rot off due to their inability to absorb moisture. Surface watering does not reach the roots and surface-root growth should be avoided. Succulent plants must be watered differently than other house plants which bear true leaves. Do not water on cold days.

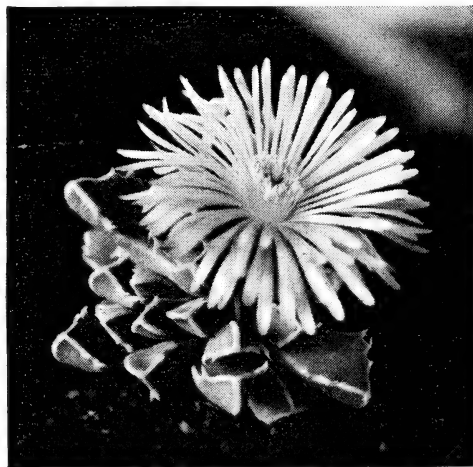
Cultivated plants require more water because of their smaller root systems which dry out quickly, especially when potted in porous clay pots. With large pots, there is a danger of keeping the pots too damp, which results in a sour soil and rotting of the roots. It is advisable to use smaller pots and a lighter soil which will remain porous. When plants show signs of growth they should be watered more freely. Always be governed by the condition of your plants. It is easy to see when they are growing; the head of the plant be-



Many of the other succulents are grown because of their unique shapes rather than for the more spectacular flowers found among the cacti. This Stone Face (*Pleiospilos bolusii*) must not be over watered during its dormant season.

comes lighter green and takes on a waxy appearance, while fresh, white wool and new spines form and the whole plant takes on a "lively" look. This is a sign for more water—not too much at first,

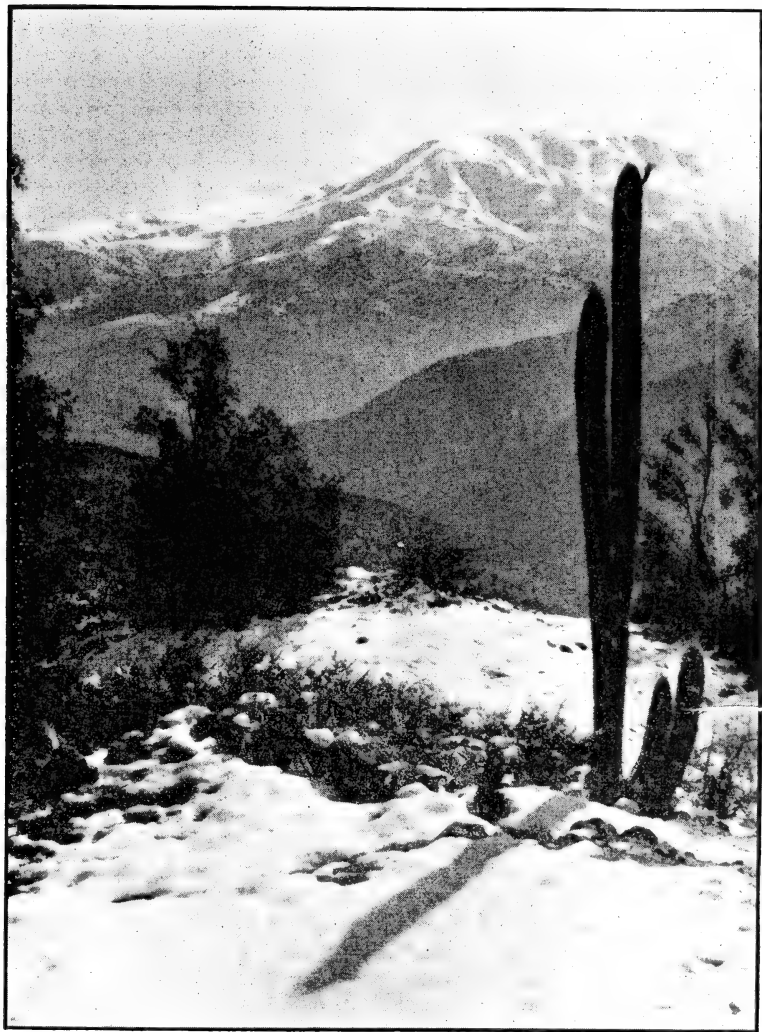
but an increased amount as growth continues. By early summer, most kinds can be watered about as freely as any other plants, always remembering not to give more water than will be absorbed readily by the soil. In late summer and early fall, begin to cut down on the water, gradually letting the plants become almost dry so as to harden them off in preparation for the dangers of winter.



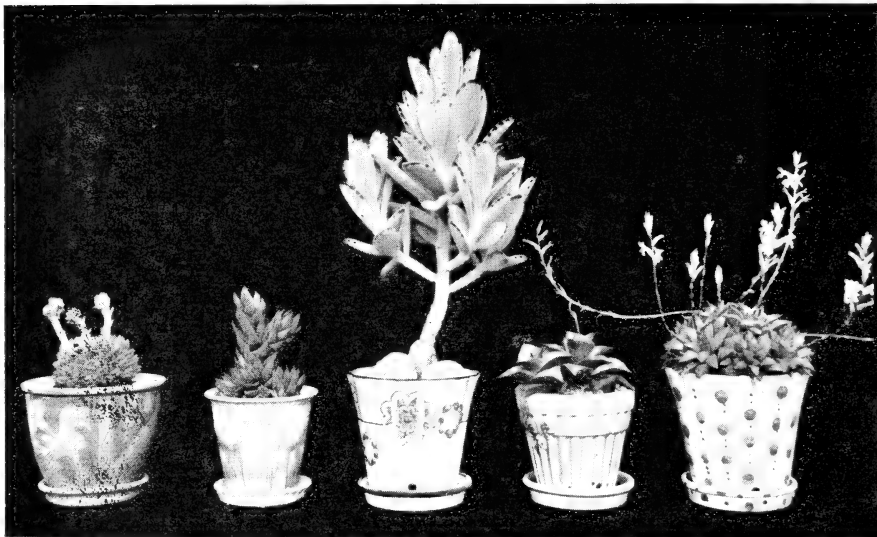
The Tiger Jaw (*Faucaria*) from So. Africa has large golden flowers in the early spring.

### *Plants Need a Rest Period*

Do not forget that plants must have their rest period, usually from October to April, when they should be kept almost dry and at about 40-50° temperature. Do not expect the plants to grow the year around. Nature plans a period of rest for all plants and for the best flowering results the habits of the plants should be studied so that the normal resting period may be maintained. There is such a wide range of habitats and variation in seasons it is difficult to treat all plants the same. Some will try to grow in our winters when we prefer to have them rest.



Although some cacti grow in arid mountains, do not expose yours to frost.

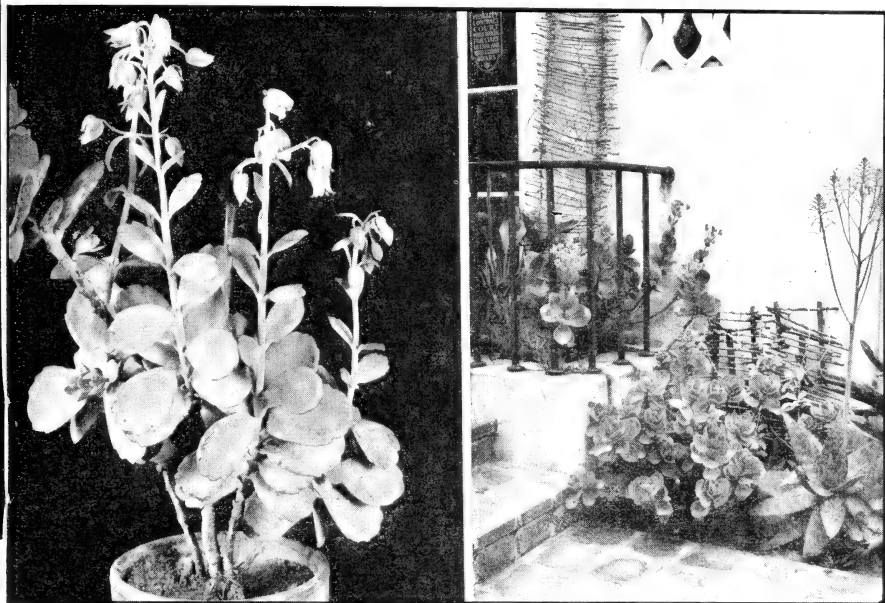


Interesting glazed pots. From left to right the plants are: *Echeveria setosa*, *Haworthia* species, *Kalanchoe tomentosa*, *Haworthia tessellata*, *H. turgida*. All  $\frac{1}{8}$  size. Although cacti and the other succulents respond to good care, they will also stand more neglect than ordinary house plants.

## POTS AND POTTING

Whether plants are kept indoors, in glass houses, or outdoors, they must be carefully potted. A potted plant may be moved to the correct exposure, may be moved to the glasshouse for special attention, may be taken to a sunny location during the warm weather or it may be moved out-of-doors and the entire pot plunged into the soil. There are endless advantages in having plants potted unless one is fortunate enough to live in a mild climate where they may be grown in the soil the year around.





*Bryophyllum fedtschenkoi* makes a good house plant and in the summer the pot can be plunged into the ground to color up for winter.

A potted plant is more delicate than one grown out-of-doors and its root system is more restricted. Thus, a potted plant will not survive the extremes of heat and cold and should be treated with consideration. Plants grown in the ground are more vigorous because they can supply their own requirements.

More succulents are doomed by improper potting than by any other cause except possibly over-watering of the desert types. There are a few simple rules that should be followed.

Most instruction sheets will advise the use of only terra cotta pots and never glazed pots. However, many growers do not agree with

this. If the soil is well drained, it dries out too rapidly in a clay pot which in itself absorbs moisture from the soil. A clay pot becomes chilled as the water evaporates through its pores and the roots seeking the walls of the pot also become chilled. Or during hot dry days the moisture is all drawn from the soil and the root tips are burned or dried by the pot's nonresistance to the heat. It has been demonstrated that plants make better growth when a 5-inch clay pot is set inside a 6-inch pot with an insulation of sand or moss between the two pots. This disproves the advantages of clay pots in favor of glazed pots which tend to keep plants at a more even temperature.

Glazed pots must have very porous soil so that water will never stand on top of the soil. There must be a sizable drain hole in the bottom over which moss, broken pots, charcoal and sand are placed to drain the water from the richer soil above. Glazed pots have the advantage of being decorative and also demand less attention because they do not require water as frequently during the hot months.

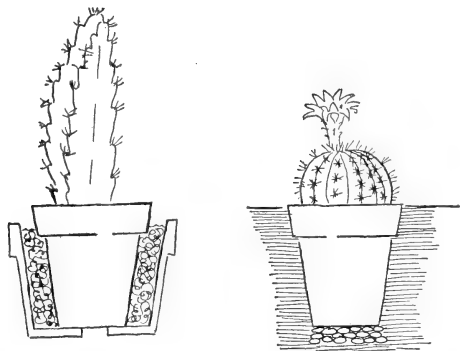
Succulents will flower better if the pots are not too large in relation to the size of the plant; it seems that reasonable restriction of root growth encourages flowers. However, the size of the pot should be a little larger than the plant's circumference including the spines. If old pots are used they should be cleaned with a stiff brush and sterilized by boiling in hot water. This kills all fungus growth such as the green algae which is seen so frequently on pots and covering the soil. New clay pots should be soaked in water for a day or two to clean the pores and to wash out some of the alkali.

The purpose of repotting is to *replace worn out soil* or to provide more space for roots. In some cases application of food (leaf mold, manure, or prepared plant food) may temporarily take the place of repotting. Small plants grow better when planted together in a large pot or preferably a wooden tray which prevents too rapid drying out. Miniature pots can neither retain moisture nor sufficient food supply for the smallest plant.

Potting may take place when new growth announces the growing season. How does one tell when new growth is evident? There might be a brighter coloring of the spines at the top of the plant,

formation of new spines or a general expansion of the plant body with a deepening shade of waxy green. It is easier to transplant or repot plants during their growing season; however, there is a danger of blighting the flowers unless repotting takes place after the flowering season.

Keep a liberal supply of prepared soil on hand, using the basic mixture of  $\frac{1}{3}$  sand,  $\frac{1}{3}$  loam and  $\frac{1}{3}$  leaf mold. To this can be added gypsum, charcoal, fertilizer or lime, as indicated for the species to be potted.



Drying out of clay pots may be prevented by placing one pot within another (left) or plunging the pot in soil or box of sand (right).

When first potting collected plants or large specimens, especially cacti, inspect each plant carefully before potting. If the roots are broken, cut them off above the break with a clean, sharp knife and dust with powdered charcoal, sulphur, or "Semesan" to prevent infection. All damaged and especially fibrous roots should be removed just below the plant body. Only one in ten will follow this last instruction because one hates to de-root a plant; but experience will eventually prove that a plant will re-establish itself sooner by growing a new set of healthy roots. Always trim off diseased roots.

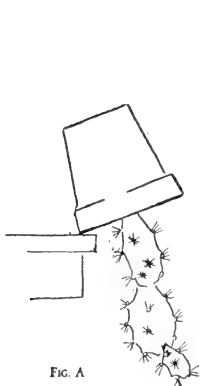


FIG. A



FIG. B



FIG. C

Break the crown or hard edges of the ball of roots in Fig. B and loosen the mass of roots.

### *Potting Technique*

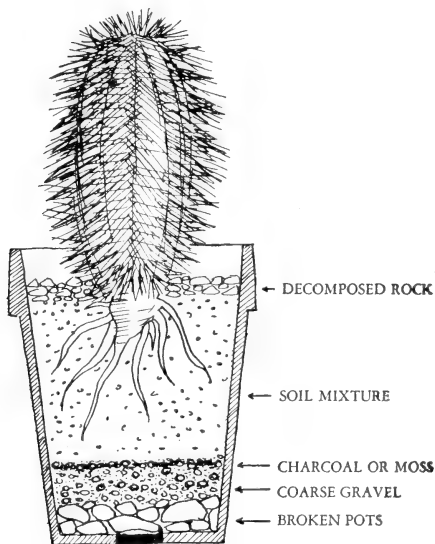
Before repotting, the soil in the pot should be only slightly damp so that it may be easily shaken from the roots when necessary to free the plant from any bugs infesting the root system. A healthy plant or seedling requiring a larger pot may have the soil dampened so that the plant with its ball of earth may be gently tapped out of the old pot and placed in the new pot with little root disturbance.

Prepare perfect drainage by putting an inch or more of broken pots or small pebbles in the bottom of the pot and a layer of sand or gravel over these. A light sprinkling of charcoal and screened moss is also beneficial. This bottom layer provides perfect drainage and keeps the soil from becoming soggy, sour or acid—all of which are deadly to succulents.

In removing a plant from a pot, tap it gently upside down on the corner of a table (Fig. A) and the plant and its ball of roots (Fig. B) slide out easily.

Hold plant by tongs in the proper position in the mouth of the pot and fill around it with the prepared soil, gently tamping it in

with the handle of your trowel or better yet, tap the pot on the table two or three times to settle the soil. Be sure to have soil come up just to the line to which the plant roots were previously buried and low enough in the pot to allow for watering. Add a thin layer of loose gravel to prevent the soil from washing away.



Do not water the plant for several days after potting to allow time for the cut or broken roots to heal. Never use wet soil for potting. Protect newly potted plants from strong sun until water can be applied without danger of rotting the roots.

Tin cans are frequently used as pots because they do not allow the tender roots, which always seek the walls of the container, to dry and bake as do the porous pots. This advantage may prove a disadvantage in cold weather when moisture may be retained too long unless the soil is very porous and well drained. Tin cans are scoffed at by



A fine showing of Easter Lily Cacti (*Echinopsis*) grown in tin cans. Small "pups" reach flowering size in one to two years.

the well-to-do growers, yet fine amateur collections have been grown in cans and even exhibited by covering with light green corrugated paper—the ribs running up and down. Drain holes should be made in the *side* of the can near the bottom; the danger from nematode and ants will thus be minimized and the plants will not grow through the bottom. Dip the cans in hot tar to prevent rusting. The soil must be well prepared since the moisture evaporation will be less than with glazed pots.



A well planted succulent bowl made up of beautiful shades of green plants edged with reds. The container is light green.

## BOWL PLANTING

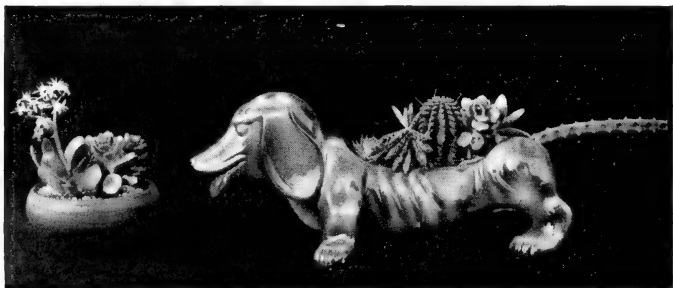
Cactus bowls are a source of enjoyment, but must always be regarded as a floral arrangement to be used for a short time only. Avoid overcrowded bowls with dry desert types, long-rooted varieties, tropical plants and a few of the other succulents thrown in for good measure. When first planted these bowls may be colorful, but they soon produce unnatural growth or rot and die.

A correctly arranged bowl consists of a few rooted seedlings or cuttings of related cacti that thrive with shallow root systems and that require a like amount of water. Reliable dealers will furnish a selection of inexpensive plants for this purpose, and they need not be the rare varieties.

In preparing the bowl for planting, it should be filled one-third of its depth with broken pots or coarse gravel. Cover this with a mixture of good, loose loam or a selected soil for a particular species. This soil may be a little heavier than is used in large pots because shallow dishes dry out much faster. After the plants are arranged, sprinkle the top with charcoal or decomposed granite and place a few colorful, jagged rocks to serve as a background and to set off the plants.

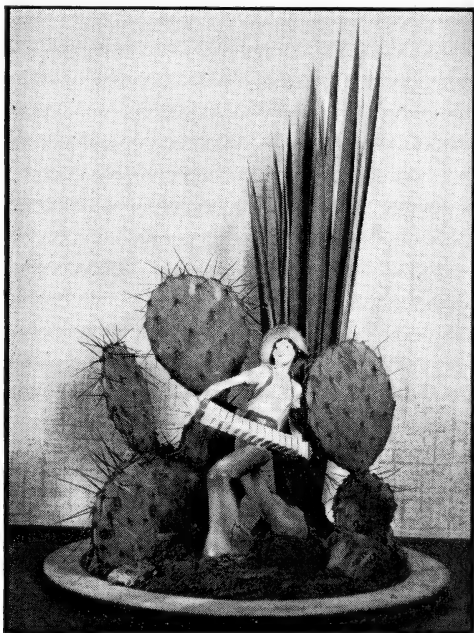
Water as soon as the soil becomes almost dry. Fill the bowl with water, but do not pour the water directly on the plants, although an occasional syringing on warm days keeps them fresh and clean. Never syringe a plant on a damp day or while the sun is on it.

Never allow the soil to become soggy. Bowls may be placed on the living-room table for decorative effect, but during the sunny hours they should be placed so as to absorb the sun's rays. As the



These plantings must be considered of short duration although it is surprising the amount of abuse they will stand.





Prize winning arrangement made of the Prickly Pear and Yucca leaves.

plants grow, they should be repotted in separate pots and replaced with smaller kinds.

Succulents, including cacti, make interesting arrangements and most of the recent flower shows have had many entries. The firmness of succulents and the interesting forms with their varied colors lend themselves to bowl arrangements. More and more succulents and even the flowers of the smaller Orchid Cacti are used for corsages.

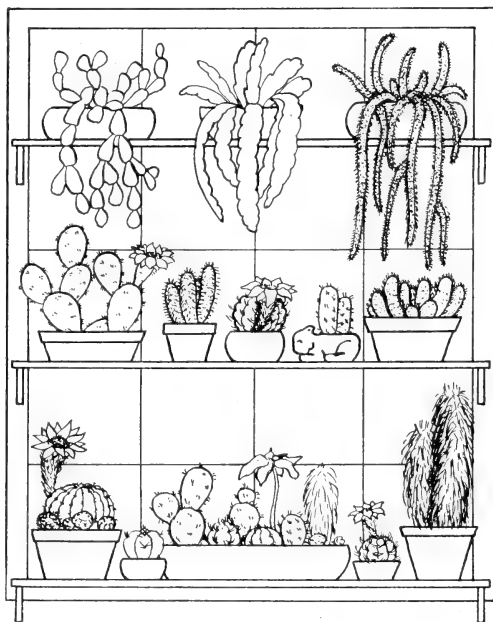


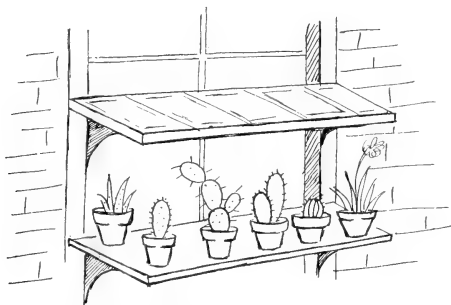
Plate glass makes neat window shelves for potted succulents. Glass curtains should be drawn so that the hot sun will not fall directly on the plants.

## WINDOW GARDENS

In the United States there are few homes that do not already possess a Christmas Cactus, a Rat-tail Cactus, or perhaps an Orchid Cactus. In sections where the winters reach forty degrees below zero, these highly prized cacti are given a warm corner for the cold nights and then find their place in the sunny window during the day. Cacti are well adapted to indoor window sills where the air is dry. They have the advantage over other plants since they may be left for

days without watering and suffer no harm, due to their water storage qualities for just such drought periods.

Alcove windows are most desirable for cacti since the glass on three sides increases the amount of time that the plants may enjoy the sunlight. Venetian blinds are ideal for protection against the hot sun in summer and the cold nights of winter. Be sure that the plants do not touch the window and turn the pots every day at noon so that all sides will have their turn in the sun.

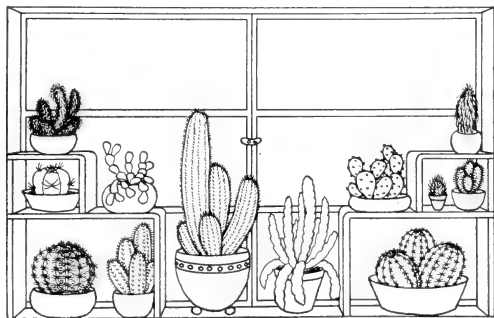


Apartment house succulent garden.

A plant window may be developed by the installation of shelves at the sill line and at intervals above to take full advantage of the glass. These shelves will be inconspicuous if they are made of plate glass, three-eighths of an inch thick. The shelf at the base of the sill should be wider for the heavier plants and should be covered with glass to protect the paint from moisture. A window box may be placed on the sill shelf for the propagation of plants and for artistic arrangements, using rough, colorful rocks and plants of varying heights. Large window boxes have the disadvantage of sunlight on only one side.

Avoid planting cacti and other succulents in outside window boxes, especially on the sunny side of the house. Unless protected, they

will burn under the scorching rays of the sun. A shelf may extend out of the window and may be protected by a window sash above. The glass should be whitewashed by using turpentine and whiting for protection during the hottest days. Fresh air is essential but care must be taken to avoid sunburn.



Removable shelves may be placed in alcoves of French windows.

Interesting pots may be used and harmonious decorative effects are gained by proper selection of color schemes. A copper pot may be used with plants of coppery shades or a dark green plant contrasts well in a light green, glazed pot. Many growers enjoy decorating the common clay pots with contrasting or harmonizing colors.

Open porches are considered ideal for cacti, but very few are arranged for sufficient sun, especially during the summer when the sun is high. Orchid Cacti (*Epiphyllums*) may do well, but the sun-loving species grow light green and become elongated and may never flower under these conditions.

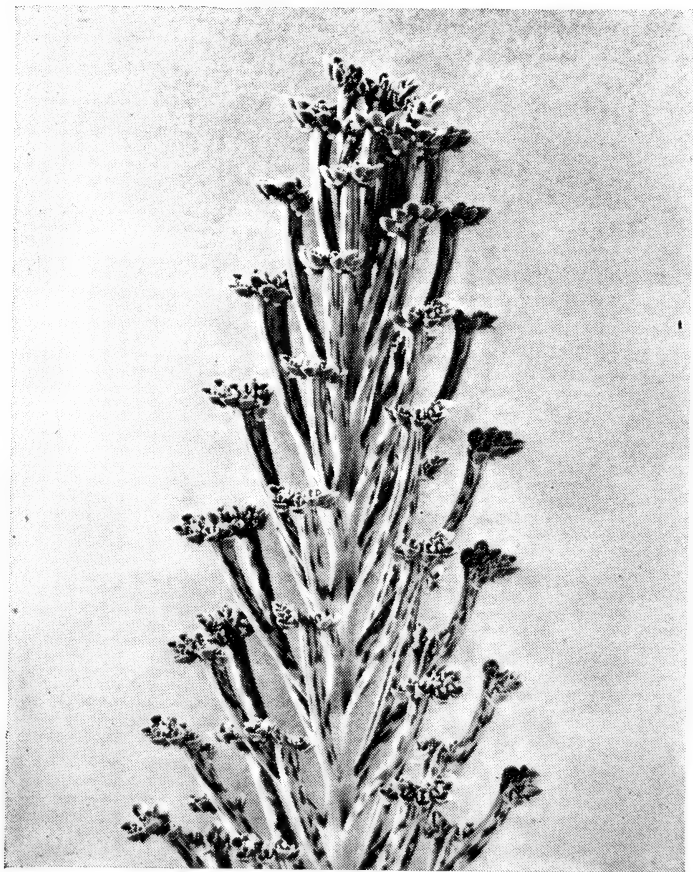
Many of the cacti with hair such as the Old Man (*Cephalocereus senilis*), or the spiny Pincushions (*Mammillarias*) will take all the sun that is available if they have been acclimated gradually.

## PROPAGATION

Cacti and the other succulents may be propagated from seed, from offsets or cuttings, and by grafting. One of the most fascinating phases of raising succulents is in their propagation. The pleasure derived from increasing the number of plants in a collection and being able to share with others is perhaps even more compensative than acquiring plants for oneself. To hand an admirer of cacti a colorful seedling potted in a two-inch pot or to remove a rooted "pup" from an Easter Lily Cactus (*Echinopsis multiplex*) is to repeat the pleasant experience you had when you were given your first plant.

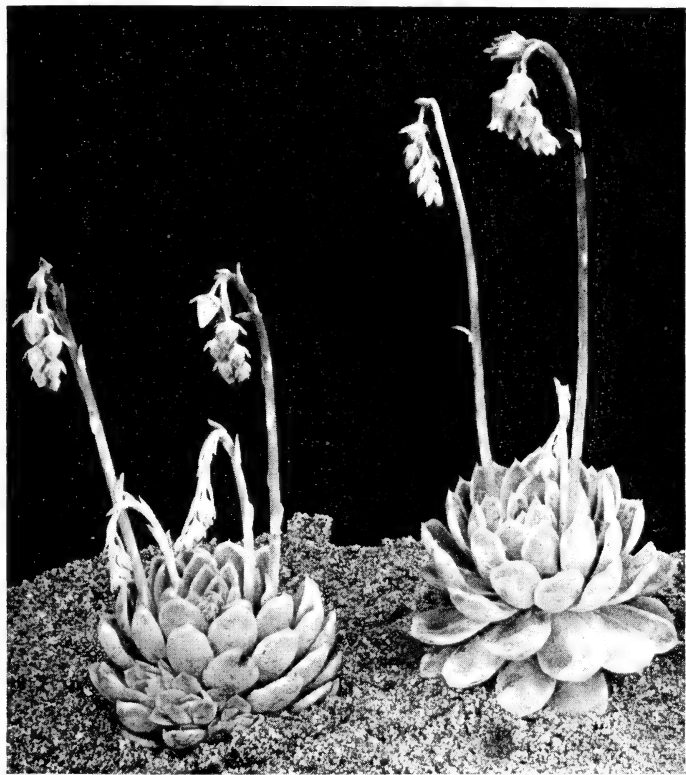


A group of the other succulents showing the interesting methods of propagation. On the left a *Gasteria* produces a mass of small plants around the base of the parent. The other four photos show fallen leaves on which baby plants have formed.

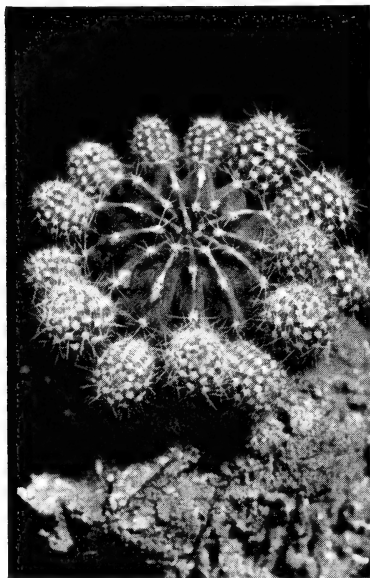


One of the most fascinating succulents in the plant kingdom. Of the Sprouting Leaf group, *Bryophyllum tubiflorum* is the most unusual as it drops tiny plants from the leaf tips.

For full enjoyment of your hobby, prepare a rooting box where you can propagate plants for your friends. As soon as a ball of roots is formed the plant may be potted.



The Hen and Chickens (*Echeveria*) is so called because of the little new plants that nestle around the base of the mother plant. There are many types in this large group of Mexican plants, each with its own form, coloring, and flowering habit.



The old dependable Easter Lily Cactus which produces as many as 25 "pups" in one year from a 2-inch *Echinopsis* hybrid. If you want a large plant leave the offsets on and you will have a sizeable mound.



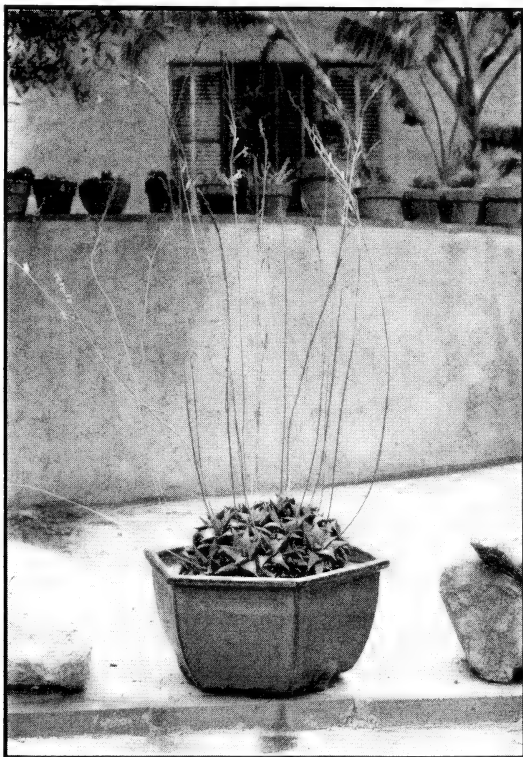
The Easter Lily Cactus has white or pink trumpet-shaped flowers 8 to 12 inches long.

### *Cuttings and Offsets*

Offsets or "pups" can be removed from older plants and can be planted immediately. Offsets or cuttings grow quickly and save a whole year or more of growing time.

Cuttings are best taken during the spring and summer months. Off-shoots may be removed and planted any time. Do not endanger your rare plants by making cuttings during wet or cold weather because of the danger from rot. Cuttings or offsets should never be broken from the parent plant, but should be cut with a clean, sharp

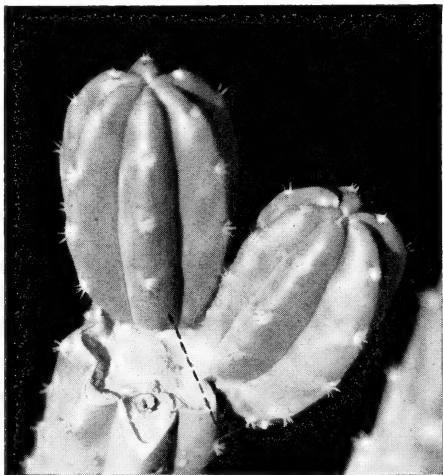




Haworthias make fine pot plants with plenty of small offsets for your friends. The above plant is in a bowl 10 inches across. Flowers are inconspicuous on long stems.

knife. Heal the cutting in a dry, partly shaded place, until it is well calloused over. The minimum period of time required for this "curing" process will vary with the species from one week to months depending on the size of the cutting and the weather.

Root the cuttings by planting quite shallowly in a clean, slightly damp mixture of sand containing peat moss and charcoal, and as soon as roots form, plant in a regular way. A cutting box will be found most convenient for quickly rooting cuts and offsets. The box filled with clean, coarse sand should be placed in a warm exposure or it may be heated by an electric bulb placed beneath the box. The ideal ex-



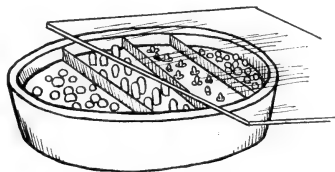
Cutting off the growing tip will increase the number of propagations which may be removed and re-rooted.

Dotted line shows where to make the cutting.

posture is in the sun, providing the sand is kept damp and the box is protected by a muslin cover. Sand is used because it is porous and speeds the formation of new roots. Desert types should be rooted in dry sand. Do not try to hurry the re-rooting of plants by over watering. Fresh cuts will induce rot if planted too soon.

*Seed Culture*

A galvanized iron or granite pan eight inches square and two or three inches deep will hold four 4-inch fern pots and eight kinds can be safely started, using half of the surface of each pot for each. Late spring and summer months are best for planting seeds, and if started when danger of cold nights is past, no heat is necessary, although it is best to maintain at least 70° for good germination.

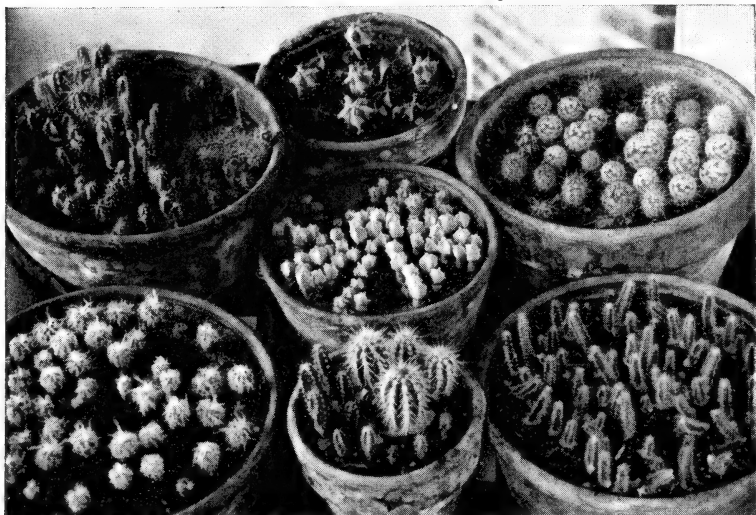


Seedlings may be grown in clay pans, sprayed with water and covered with glass or newspaper.

A deep box with an electric light bulb wired into the bottom, and containing a wire shelf above on which to stand the pans, will provide sufficient bottom heat to grow seedlings indoors in all but the coldest periods of the year. There must be room for the shelves to clear the light bulb by a fair distance, and the tops of the pots when standing in the pans on the shelf must be about one inch below the top of the box, which is then covered with a sheet of glass.

Be sure that the pans and pots are sterile; if not new, they should be boiled to assure sterility. In the bottom of each pot, put one inch of coarse washed pebbles or pieces of broken pots that have been boiled. Then fill the pots to within an inch of the top with a soil mixture of:

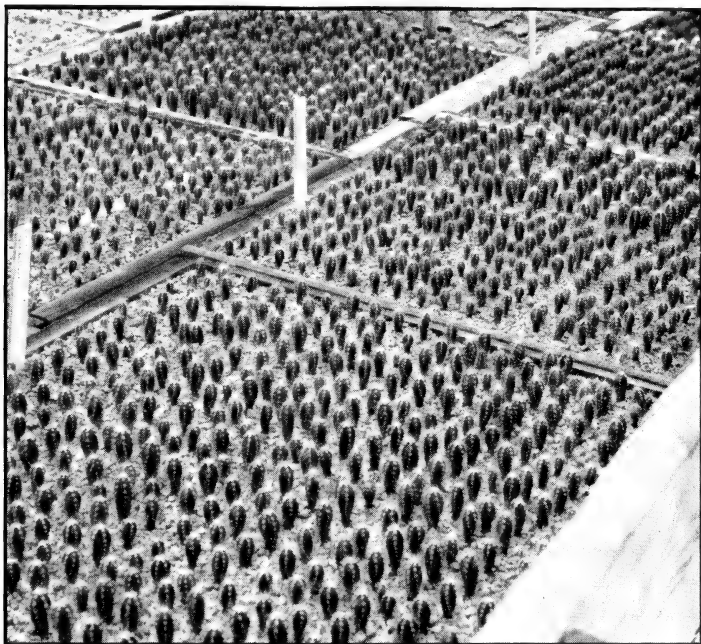
- 5 parts sifted clean sand (not seashore).
- 2 parts sifted leaf mold.
- 2 parts fine top soil (loam).
- 1 part finely powdered charcoal.



Three days to three weeks are required for germination depending on the variety. Pot-grown seedlings, shown above, ready for transplanting. Sizeable seedlings should be watered by pouring water into the pot.

It is important that the soil mixture be screened through a quarter-inch mesh and no finer. If the soil is too fine it will pack when watered. Press down lightly and see that the surface is smoothed and level. Place pots in pan and put warm water *in pan* around the pots until the soil in the pots has become uniformly damp by capillary action.

Sow the seeds uniformly on the top of the soil, placing the scar-side downward with the aid of tweezers and a magnifying glass. Commercially, one cannot take the time to place seeds, but germination repays by making it easy for the seeds to send roots into the soil. Separate the varieties of different seed by glass strips and put a small plant-tag marker in each section so that it comes only  $\frac{1}{2}$



Six-month-old seedlings of *Cereus peruvianus* have been replanted in 18-inch "flats" as shown above. These plants make rapid growth and within the next year may be 8 inches tall and a beautiful blue-green. Seedlings must never get too dry.

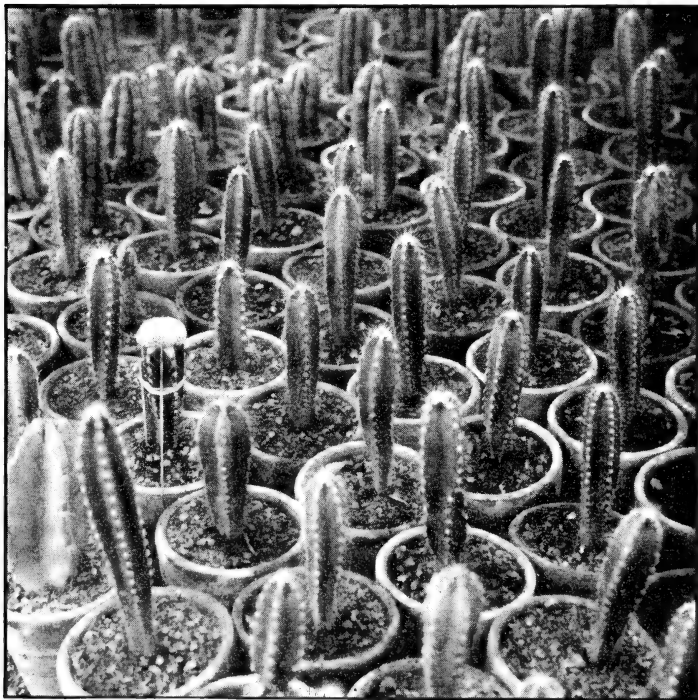
inch above the soil. This label can be numbered and a record kept of the seeds planted and the date of planting. Do not plant the seeds too thickly.

Sift enough clean, fine sand over the surface to cover the seeds to a depth not greater than the height of the seed. A layer of charcoal or pea-size poultry grit may be used instead of fine sand to keep the surface free from algae and to provide the tiny seedlings with the correct environment as they push their way from under the gravel.

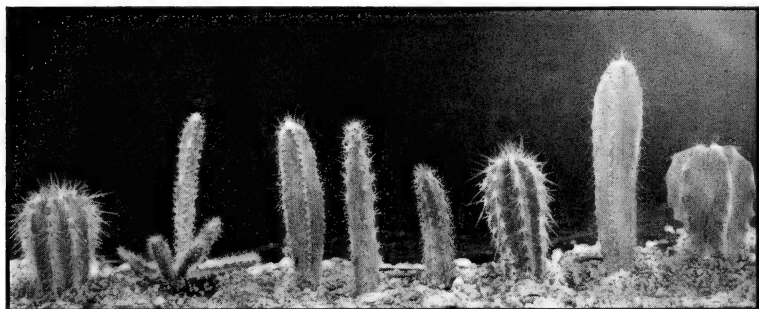
Keep seed-pan in water only until soil is moist on top and repeat as necessary to keep soil from drying out.

Cover the top of the box with a glass or cover each pot individually. Keep an even temperature of 70 to 95° F. Remove glass and wipe off condensed moisture each morning.

A light spray of "Semesan" applied by an atomizer to the surface



Eighteen-month-old seedlings of *Cereus peruvianus* transplanted into 3-inch pots. This is ideal grafting stock. Note the grafted plant and the method of holding the graft securely in place by rubber bands.

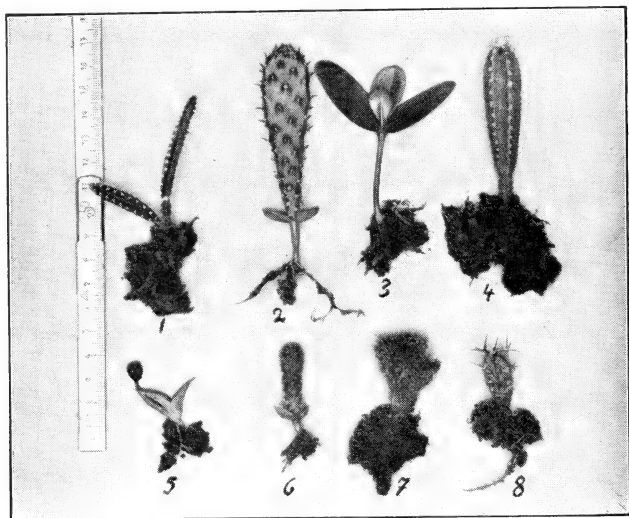


These seedlings are a good shipping size and will be ready for individual pots during the warm growing season. The plants from left to right are: *Trichocereus spachianus*, *Selenicereus vagans*, *Cereus peruvianus*, *Eriocereus martinii* (5 sided), *E. tortuosus* (7 sided), *Pachycereus pecten-aboriginum*, *Cereus peruvianus*, *Lemaireocereus pruinosus*.

of the soil aids in preventing damping-off (rotting away) caused by continuous dampness and scarcity of fresh air.

Do not expose the seedlings to strong sun. Glass covered with muslin or whitewash will give sufficient protection so that seedlings may enjoy the sun's warmth. A single thickness of white paper can be used in place of the glass. After all seeds have germinated (3 to 60 days, depending on variety), ventilate during the sunny part of the day. Never forget the need of sun, air and moisture. As soon as first spines appear, put a match under one edge of the glass to allow air to enter; increase this tilt to prevent "bronzing" or burning the seedlings. A reddish color means too much light. The amount of water can be lessened, but not to the extent of allowing the soil to dry out.

The soil mixture will care for the seedlings in their original pots over the next winter unless the plants appear too crowded. The following spring, the seedlings can be carefully transplanted into seed flats in a mixture similar to the first, but with four parts of leaf mold instead of two. In "pricking" out the tiny seedlings, a V-notched wooden stake, whittled small and thin, will be helpful

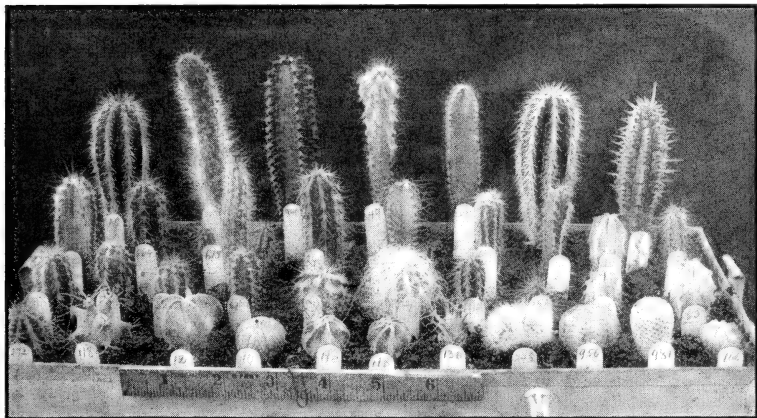


Note the different seedling forms: 1. *Selenicereus*. 2. *Opuntia*.  
3. *Pereskia*. 4. *Cereus*. 5. *Agave*. 6. *Opuntia*.  
7. *Cereus monstrosus*. 8. *Echinocactus*.

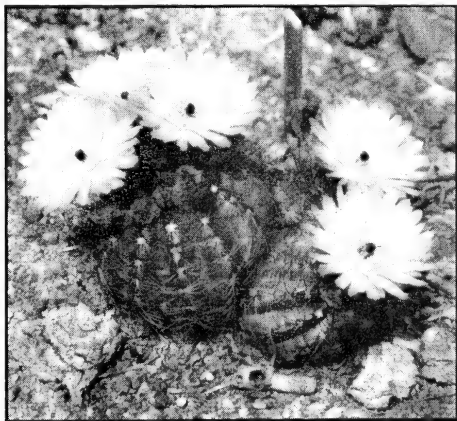
in lifting the seedlings from the seed pan without injury to the delicate root system. After seedlings are large enough to handle, it is very beneficial to transplant into fresh soil not less than three times a year.

Healthy seedlings, carefully grown, are a joy to any grower, and in variety of form and color are far more interesting than seedlings of any other plants. Some break through the soil with rudimentary leaves while others present a minute pincushion of two or three spines. Some are hairy while others are fat little bodies resembling a rock. To watch the rapidly changing forms and the increasing color makes seed raising most enjoyable, as each day brings new surprises. Experiment on inexpensive seeds and try the rare kinds later.

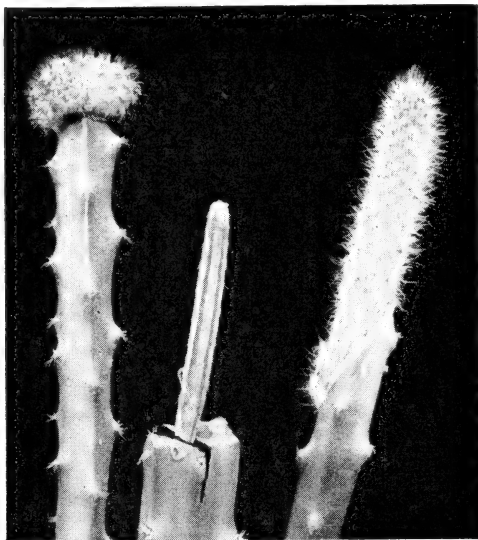




A collection of seedlings that are a pride to any collector. In just a few short years these will be specimen plants.



*Notocactus ottonis* soon grows to a mature plant and will reward you with golden flowers throughout the summer.

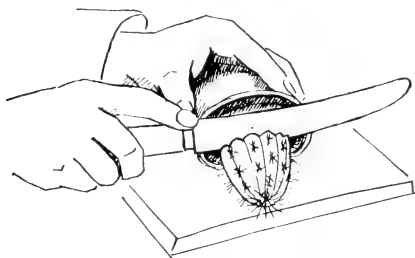


Three types of grafts: 1. Flat graft. 2. Cleft graft. 3. Side graft.

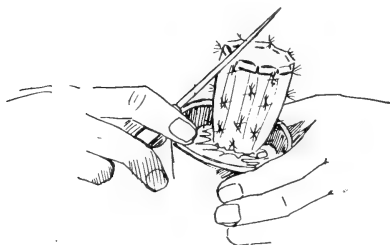
### *Grafting*

The conditions of our age are such that even in gardening a restless impatience urges the majority of those engaged in either a hobby or profession to pursue those lines which yield the maximum results in the shortest space of time. This is especially true in the grafting of cacti. Most of the other succulents make such rapid growth that grafting is not necessary to speed the maturity of a plant. However, a slow-growing cactus or a tender plant may be grafted on a huskier "stock" with breath-taking results. Grafting is often used to save a cactus when only a small piece is available or when most of the plant

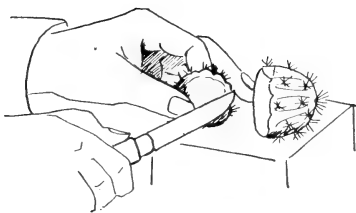
## STEPS IN GRAFTING



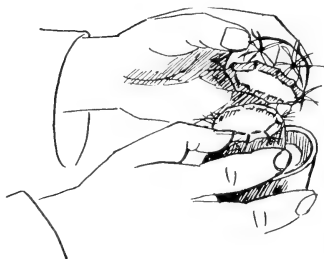
1. Cut the grafting stock for a flat graft.



2. Trim the rough edges from both scion and stock.



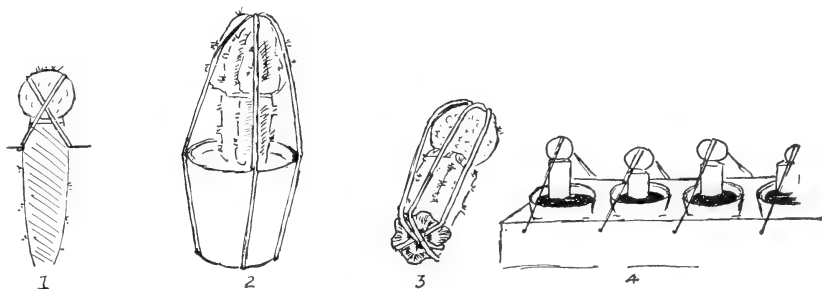
3. Cut the scion or plant to be grafted. Make a final fresh cut, avoiding spines.



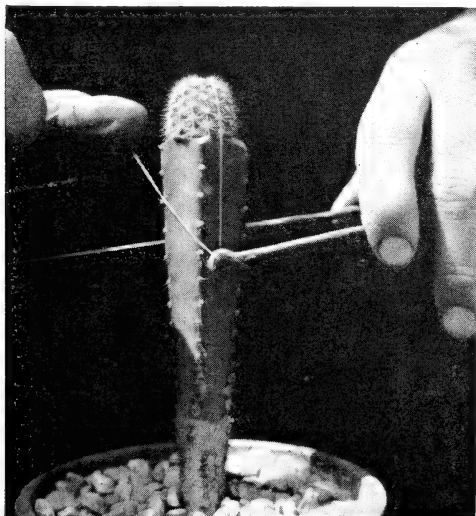
4. Place scion snugly on stock and secure with rubber bands.



A collection of cacti grafted on one large *Cereus*. The plants in flower are *Echinocereus papillosus* and *Echinopsis polyancistra*. As a novelty, twenty kinds of cacti have been grafted on a single potted *Opuntia*.



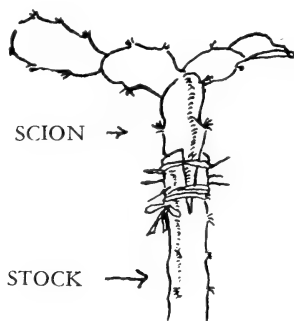
Methods of holding the scion to the stock. 1. Rubber bands looped over a spine which pierces the flat joint of an *Opuntia*. 2. Looping the bands around the small pot. Be sure to place the band *under* the pot first and up over the graft. 3. Looping the bands around scion and stock which has not been rooted. 4. Trough edged with nails over which the bands are looped.



A handy tool for holding the band in place when using a spiny stock. This particular stock is a *Cereus peruvianus* seedling quite free from spines.

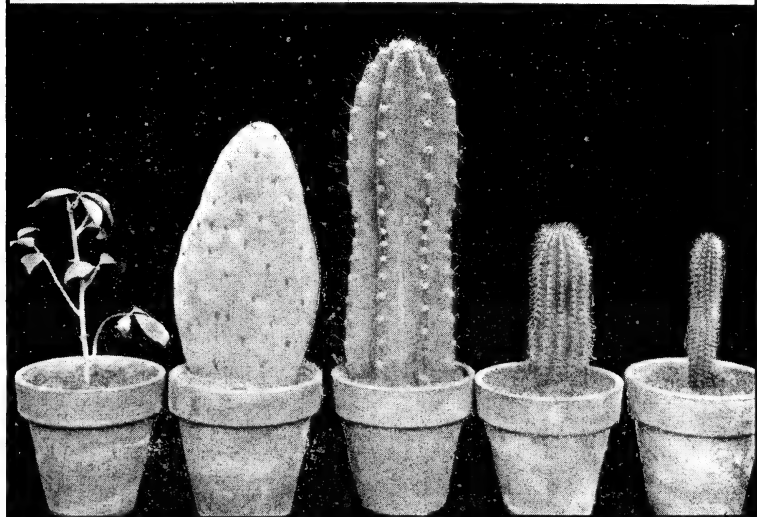
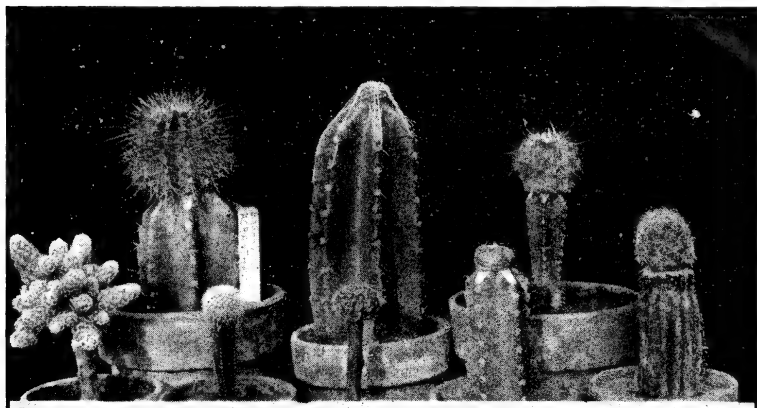
may have become destroyed. Seedlings may be grafted on heavier stock to quicken their growth and maturity.

The best time of year to graft is when both the part to be grafted (scion) and the plant on which the graft is placed (stock) are both making growth. Old, hard growth that seems dormant is difficult to graft with any success.



There are several types of grafting depending on the shape of the plant you are to graft. The principle is the same in all—that is to unite the growing tissue. The outer covering must not hold the two sections apart and enough pressure must be applied to hold the two parts together until they have united. Rubber bands or cactus spines are used to hold the scion on the stock or sometimes a suitable weight can be applied. Often the more succulent plants, like *Stapelias*, have such a sticky sap that they will unite by just being put together.

After the graft is made it is best to keep it in a moist and warm place so that the union will not dry out and force the graft apart. After several days the bands may be removed and the spines, if any were used, may be withdrawn. Do not use needles to hold the graft together because they will cause an infection and rot will result.

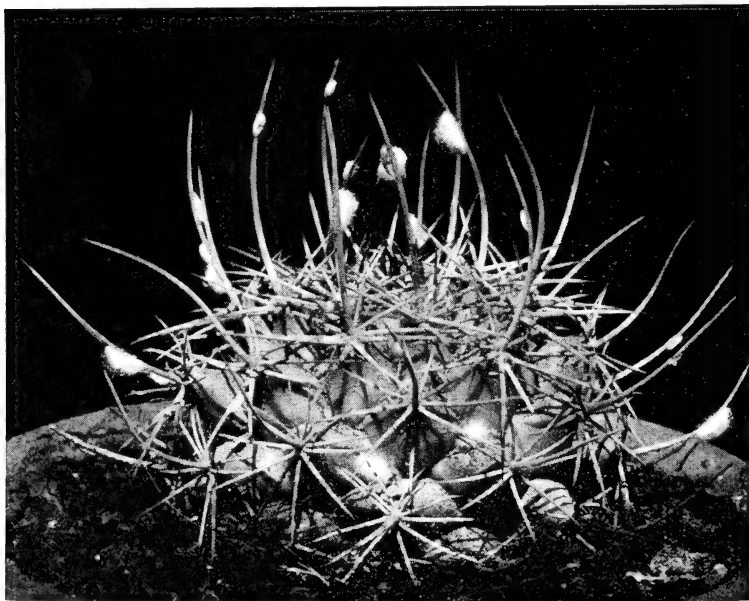


Top photo: A group of flat grafts on various stocks. Lower photo: Grafting stock *Pereskia aculeata*, *Opuntia hybrid*, *Cereus hildmannianus*, *Trichocereus spachianus*, and *Nyctocereus serpentinus*.

## PEST CONTROL

It is a wise precaution to give new plants a fine spraying with denatured alcohol, or to wash them in Ivory soap and water in order to keep from bringing pests into your collection. It is far easier to prevent infestation than to eradicate it.

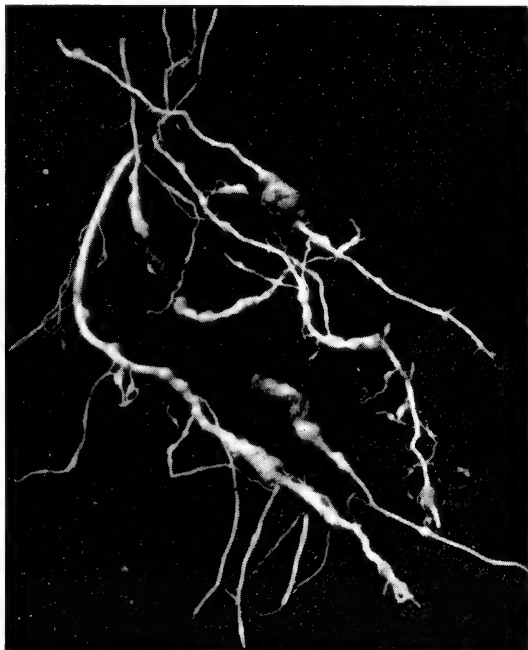
Watch the plants that are not growing and if parasites cannot be detected on the plant body then uproot the plant. See if the roots are in healthy growing condition. If they are rotted or broken, they



The photo shows spine mealybugs enveloped in a cocoon. An oil spray smothers this pest and the bugs are easily washed off with a spray of water. One spraying will not eradicate an infestation.



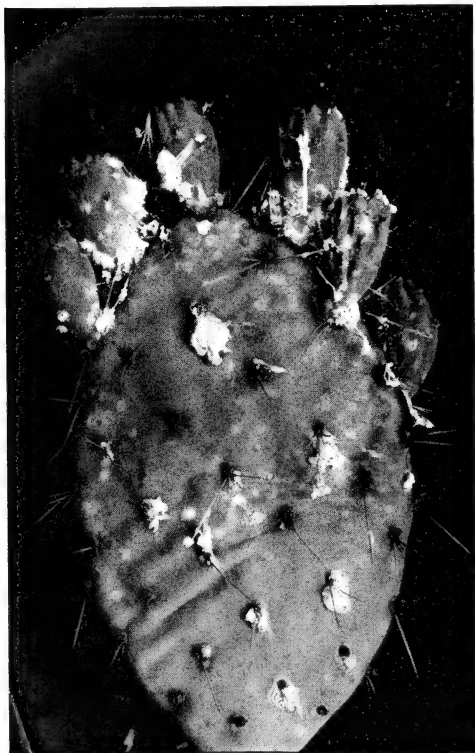
should be cut off clean and the plant should be re-rooted. Or there might be a borer working on the root or ants harboring mealy bugs. Insects may be the cause of a weak or slow-growing plant. It is



If a plant is sick it may have these globules on the roots. Nematodes spread rapidly and contaminated soil should be thrown out. Plants must be de-rooted and started in a clean pot.

essential to watch your plants and keep them in a *healthy*, growing condition and never too crowded.

Plants grown indoors without sufficient ventilation throughout the



These webs contain a red insect called cochineal from which a dye used to be extracted. Remove the webs with denatured alcohol and spray periodically.

year furnish perfect living conditions for insects, and it is therefore natural that pests increase and multiply to an amazing extent when no control measures are adopted. Natural insect enemies which keep the pests within bounds in the open spaces are not to be found in these close quarters.

Outdoors, one must guard the plants from dogs, birds, and even rats. More collections have been ruined by these obvious causes than

from the unseen pests. Sow bugs, snails, slugs, and ants should be kept from the plants by the use of any number of controls offered for sale by any store dealing in plants. Snails have been known to ruin an entire Orchid Cactus collection in one evening. Ants enter the drain holes of pots and deposit mealy bugs which sometimes do enormous damage underground before they are discovered.

For spine mealyes and scale there are some dependable oil sprays containing nicotine and other agents. These same sprays will also keep your plants free from red spiders, thrips and aphids ("plant lice"). Brownish, scab-like discoloration starting at the base of the plant may be the result of thrip or red spiders.

Instead of waiting to meet these insects face to face why not use an oil\* spray regularly and keep ant, snail, and sow bug bait near your plants if they are subjected to these pests?

Withering or yellow plants usually indicate that the plant needs a richer soil or the roots have rotted off from too much or too little moisture. After cleaning the roots of any decayed matter repot in fresh soil containing more leaf mold or a little well-rotted fertilizer. Water very lightly if at all until new roots have formed.

For soft rot, usually caused from too much water, root damage, or frost, there is little that can be done except to cut the plant well above the rotted section until there is only *clean tissue*. If you do not cut high enough the plant will continue to rot. Dry the cutting thoroughly one week to a month or more, depending on the weather, and then re-root.

Keep the green moss or algae from gathering on the pots and from the soil in the pots. Keep the soil stirred up, repot or apply a weak solution of copper sulphate (1 oz. to 10 gallons of water).

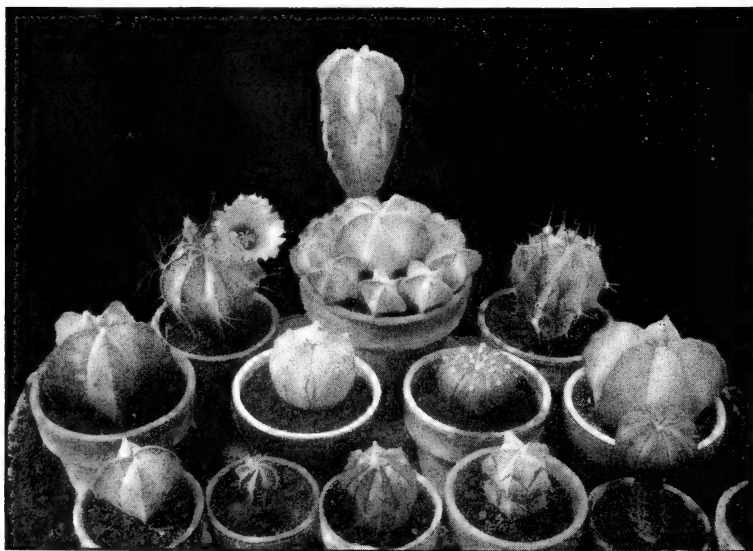
Scale is easily recognized as flat bodies a little larger than a pin head; it is usually first discovered at the base of a plant or underneath in sheltered places and is easily removed as tiny flakes. Regular spraying will kill an infestation unless it is too bad. Do not harbor a sick, badly diseased plant or you will be sorry.

\*Oil spray means one with an oil base. Besides the active ingredients the soap acts as a spreading vehicle and the nicotine is effective on sucking insects.

## COLLECTING

Many collectors have started with a dish garden or a Mexican bowl arrangement. The strange shapes, vivid coloring, and fascinating growth have developed such an interest that one wants to make a collection.

While learning the habits and requirements of both cacti and the other succulents it is well to experiment with the more common kinds which are usually available from your local dealer. Some of the most interesting plants are among the common varieties and



Bishop Caps (*Astrophytum*) are an interesting group to collect or it may be *Haworthias*, *Echeverias*, *Mammillarias* or any one of a hundred interesting genera. Note the large yellow flower in the above photo. Many of the plants resemble seashells.

a few years ago these same plants were costly collectors' items. Thanks to those who have specialized in distributing succulents most of the desirable kinds are now produced in quantity.

In planning a collection, master the proper soil variations and the best watering methods. Get the habit of *recording where and when you got each plant* and how it responds to different treatments. Many a collector would give an arm to know where he got such and such a plant; you think you will remember but you will not. Don't try to get plants too fast; many collectors have burdened themselves with so many plants that they can not give them the proper care or enjoy the hobby they have selected.

After you have mastered growing and flowering of succulents and have obtained all of the commercial kinds from which you have made selections of the ones you want to keep, then you can start buying imports and collector's rarities. You can't grow them all, so you should specialize after you have a small group assembled as a background for general interest.

A true collector can be judged by the condition of his plants and the system he uses to record them. The goal of any collector is to mature a plant so that it will flower. Keep your plants clean and orderly.

If you would enjoy your hobby to the fullest extent subscribe to a cactus and succulent magazine so that you can hobnob with other growers. Then you will want to study about these plants so that you can talk intelligently about the different kinds (species) with their correct names—you will have outgrown the common names.

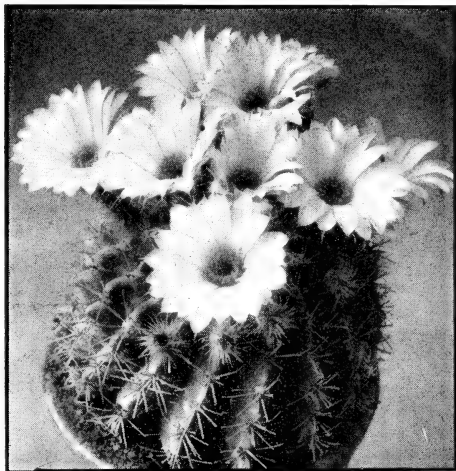
Monographs which amount to 1200 pages have been written on a single group (genus) of the succulents, while Carnegie Institution of Washington spent a small fortune in compiling a monograph on cacti. Scientists, botanists, doctors, explorers, boys and girls, and just common people have all joined in the fascinating study of succulents until a world-wide unity has resulted with one language—that of the cactophile.

## **AVOID WINTER TROUBLES BY GOOD SUMMER CARE**

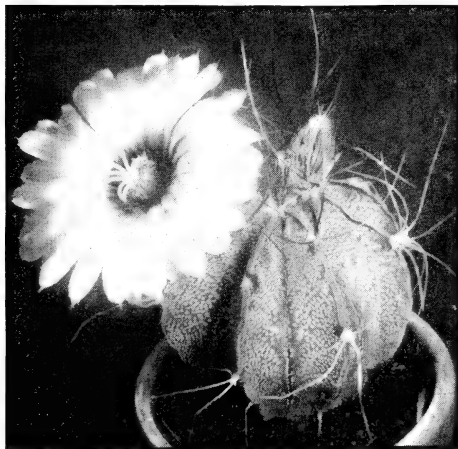
1. Wintering succulents begins with good care in summer and autumn.
2. Since all cacti are succulents, they must have sufficient moisture during their growing period.
3. Inspect daily if weather is damp and cloudy to forestall decay.
4. Examine plants, pots (around drainage hole and rims), greenhouse benches for insect life.
5. Use sprays regularly according to proportions recommended by manufacturer.
6. Get rid of pests during summer and fall. Winter spraying is not always advisable.
7. If plant is not lighted equally from all sides turn pot once a week.
8. Poor ventilation insures early succulent graves next winter.
9. Use fresh soil and sufficient drainage if plants need repotting.
10. Keep plants with similar needs near each other.
11. Try to keep a duplicate of the less hardy types (offsets, cuttings, etc., help assuage the grief over the loss of a fine plant).
12. Small rockeries are fine for summering some types of plants and so is the semi-shade afforded by trees, grape-arbors, lath and muslin houses; but be certain to rid the plants of all insects and diseases before moving to winter quarters.
13. Study, read, write, talk to other cactophiles, and add a few new plants frequently to your collection as time and finances permit. Never let your interest lag.
14. Keep records of treatment, culture, weather conditions and blooming and rest periods, insect and disease attacks, and recoveries, or failures.

If all growers would follow the above rules they would be spared many failures. Yet most beginners must learn through trial and error and with the loss of many fine plants. So often a person becomes over ambitious in assembling plants too fast and then when the "frost hits" or a severe storm strikes an improperly housed collection, the damage is done. Prepare a place for your plants first and keep ahead of them—drive your hobbyhorse, don't let it drive you.

Many people think that succulents and especially cacti will only flower in the warm climates. There may be some kinds that will only flower out-of-doors or in those localities having abundance of sunshine the year around, yet in the Middle West, and from Canada, Europe, and practically every country of the world have come reports of collections that flower.

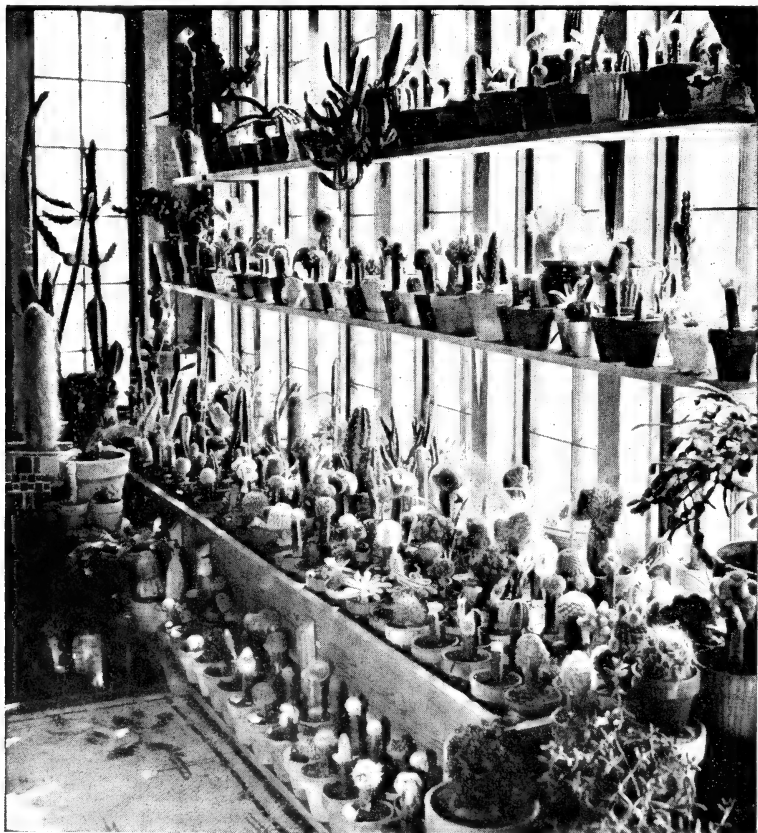


*Echinopsis spiniflora*



Bishop's Cap—*Astrophytum capricorne*

Each locality must solve for itself the best conditions for providing the maximum sun and air. Some glass-houses in the East flower more cacti than many California gardens.



A window collection in Dayton Beach, Florida.



## COMMON NAMES

### Of the Best Know Succulents

#### CACTI

- Arizona Giant—*Carnegiea gigantea*  
 Agave Cactus—*Leuchtenbergia principis*  
 Aztec Cactus—*Aztekium ritteri*  
 Barbados Gooseberry—*Pereskia aculeata*  
 Barrel Cactus—Any species of *Ferocactus*  
 Beaver Tail Cactus—*Opuntia basilaris*  
 Bird's Nest Cactus—*Mammillaria camptotricha*  
 Bishop's Cap—*Astrophytum myriostigma*  
 Blind Pear—*Opuntia rufida*  
 Boxing Glove—*Opuntia mamillata cristata*  
 Brain Cactus—Any species of *Stenocactus*  
 Buckhorn Cactus—*Opuntia acanthocarpa*  
 Bunny Ears—*Opuntia microdasys*  
 Burbank's Spineless—*Opuntia ficus indica*  
 Button Cactus—*Epithelantha micromeris*  
 Chain Cactus—*Rhipsalis paradoxa*  
 Chin Cactus—*Gymnocalycium* species  
 Cholla Cactus (Choya)—Any spiny species of cylindrical *Opuntias*.  
 Christmas Cactus—*Zygocactus truncatus*  
 Claret Cup Cactus—*Echinocereus triglochidiatus*  
 Cob Cactus—*Echinocereus reichenbachii*  
 Cotton Ball—*Euphorbia lanata*  
 Cow's Tongue—*Opuntia linguiformis*  
 Crab Cactus—*Zygocactus truncatus*  
 Creeping Devil Cactus—*Machaerocereus eruca*  
 Crown Cactus—Species of *Rebutia*  
 Curiosity Plant—*Cereus monstrosus*  
 Dahlia Cactus—Any species of *Wilcoxia* or *Peniocereus*  
 Deerhorn Cactus—*Peniocereus greggii*  
 Devil Cactus—Any species of prostrate *Opuntia* especially *O. schottii*  
 Devil's Head—*Homalcephala texensis*  
 Dope Cactus—*Lophophora williamsii*  
 Dry Whiskey—*Lophophora williamsii*  
 Easter Cactus—*Schlumbergera gaertneri*  
 Easter Lily Cactus—Any species of *Echinopsis*  
 Empress of Germany—*Nopalxochia phyllanthoides* and its hybrids  
 Feather Cactus—*Mammillaria plumosa*  
 Firecracker Cactus—*Cleistocactus baumanii*

- Fishbone Cactus—*Epiphyllum anguliger*  
 Fish-hook Cactus—Any species of *Ferocactus*, *Mammillaria*, etc., with hooked spines  
 Fox-tail Cactus—*Coryphantha desertii*  
 Fragile Opuntia—*Opuntia fragilis*  
 Giant Cactus—*Carnegiea gigantea* (Saguaro)  
 Golden Ball Cactus—*Notocactus leninghausii*  
 Golden Barrel Cactus—*Echinocactus grusonii*  
 Golden Star Cactus—*Mammillaria elongata*  
 Grizzly Bear Cactus—*Opuntia erinacea* and *O. ursina*  
 Hedgehog Cactus—Any species of *Echinocereus*  
 Horse Crippler Cactus—*Homalocephala texensis*  
 Indian Comb—*Pachycereus pecten-aboriginum*  
 Indian Fig—*Opuntia ficus-indica*  
 Joseph's Coat Cactus—*Opuntia monacantha variegata*  
 Jumping Cactus—*Opuntia bigelovii* or *Opuntia fulgida*  
 Lace Cactus—*Echinocereus reichenbachii*  
 Lady Finger—*Mammillaria elongata*  
 Lamb's Tail Cactus—*Wilcoxia schmollii* (*W. senilis*)  
 Large Flowered Opuntia—*O. grandiflora*  
 Lemon Vine—*Pereskia aculeata*  
 Living Rock Cactus—*Ariocarpus fissuratus* or any *Ariocarpus*  
 Mescal Button—*Lophophora williamsii*  
 Mexican Dwarf Tree Cactus—*Opuntia vilis*  
 Mexican Giant Barrel—*Echinocactus ingens*  
 Midget Cactus—*Frailea* species  
 Mission Cactus—*Opuntia megacantha*  
 Mistletoe Cactus—*Rhipsalis* species  
 Moon Cereus—*Selenicereus* species  
 Myrtle Cactus—Any species of *Myrtillocactus*  
 Negro Fingers—*Opuntia clavarioides*  
 Niggerhead Cactus—*Echinocactus horizontalthalonius*  
 Night Blooming Cereus—Any of about 500 species of night bloomers but especially *Nyctocereus serpentinus*  
 Nipple Cactus—*Dolichothele sphaerica*  
 Old Lady Cactus—*Echinocereus delatetii*  
 Old Man Cactus—*Cephalocereus senilis*  
 Old Man of the Andes—Any species of *Oreocereus*  
 Old Man Opuntia—*Opuntia vestita*  
 Old Woman Cactus—*Mammillaria bahiana*  
 Orchid Cactus—The hybrids of *Epiphyllum*  
 Organ Pipe Cactus—*Lemaireocereus marginatus* also *Lemaireocereus thurberi*  
 Paper Spined Cactus—*Toumeya papyracantha*  
 Paper Spined Pear—*Opuntia glomerata*

- Peanut Cactus—*Chamaecereus silvestrii*  
Pencil Cactus—*Opuntia ramosissima*  
Peruvian Apple—*Cereus peruvianus*  
Pigmy Cactus—*Frailea* species  
Pin Cushion Cactus—Any straight spined species of globose *Mammillaria*  
Pine Cone Cactus—*Encephalocarpus strobiliformis*  
Pineapple Cactus—*Echinomastus uncinatus*  
Popcorn Cactus—*Rhipsalis cereuscula*  
Powder Puff Cactus—*Mammillaria bocasana*  
Prickly Pear—Any species of flat-stemmed *Opuntia* (*Platyopuntia*)  
Queen of the Night—Many species of large flowered, night bloomers, especially *Hylocereus undatus*, and *Peniocereus greggii*  
Rabbit Ears—*Opuntia microdasys*  
Ribbon Cactus—*Opuntia turpinii*  
Rainbow Cactus—*Echinocereus rigidissimus*  
Rat-Tail Cactus—Any species of *Aporocactus*  
Sacred Mushroom—*Lophophora williamsii*  
Saguaro—*Carnegiea gigantea* (Giant Cactus)  
Scarlet Bugler—*Cleistocactus baumannii*  
Sea Urchin Cactus—*Astrophytum asterias*  
Silver Ball Cactus—*Notocactus scopa*  
Silver Tip—*Lemaireocereus beneckeii*  
Silver Torch Cactus—*Cleistocactus straussii*  
Snake or Serpent Cactus—*Nyctocereus serpentinus*  
Snow Ball Cactus—*Mammillaris bocasana* var. *inermis* and *Espostoa lanata*  
Star Cactus—*Astrophytum ornatum*  
Strawberry Cactus—Most species of *Mammillaria*  
Sun Cereus—*Heliocereus speciosus*  
Thanksgiving Cactus—*Zygocactus salmonea*  
Thimble Cactus—*Mammillaria fragilis*  
Tom Thumb—*Parodia aureispina*  
Torch Cactus—Any tall-growing, erect *Trichocereus*  
Totem Pole—*Lophocereus schottii monstrosus*  
Tree Cactus—*Dendrocereus nudiflorus*  
Turk's Cap—Any species of *Melocactus*  
Turk's Head—*Hamatocactus hamatacanthus*  
Twisted Rib—*Hamatocactus setispinus*  
Wicker Ware Cactus—The round stemmed species of *Rhipsalis*  
Woolly Sheep—*Opuntia floccosa*

## SUCCULENTS

- African Living Rock—*Pleiospilos bolusii*  
Air Plant—*Bryophyllum tubiflorum* and *daigremontianum*  
Arab's Turban—*Crassula hemisphaerica*

- Areoplane Plant—*Crassula falcata*  
Baby Joshua Tree—*Sedum multiceps*  
Baby Toes—*Fenestraria rhopalophylla*  
Blue Chalk Sticks—*Kleinia repens*  
Boston Bean—*Sedum stablii*  
Burro's Tail—*Sedum morganianum*  
Candle Plant—*Kleinia articulata*  
Candle-wood—*Fouquieria splendens*  
Century Plant—*Agave americana*  
Chalk Lettuce—*Dudleya pulverulenta*  
Chenille Plant—*Echeveria leucotricha*  
Christmas Cheer—*Sedum guatemalense*  
Cleft Stone—*Pleiospilos nelii*  
Climbing Aloe—*Aloe ciliaris*  
Cobweb Houseleek—*Sempervivum arachnoideum*  
Coconut Palm—*Bryophyllum Houghton hybrid*  
Cone Plant—*Conophytum*  
Corn Cob—*Euphorbia mamillaris*  
Cow's Horn—*Euphorbia grandicornis*  
Cox Comb—*Echeveria crest*  
Crown of Thorns—*Euphorbia splendens*  
Devil's Coach Whip—*Fouquieria splendens*  
Elephant's Foot—*Testudinaria elephantipes*  
Elephant Bush—*Portulacaria afra*  
Elephant Tree—*Pachycornis discolor*  
Elk Horns—*Hereroa nelii*  
Fig Marigold—Bushy species of *Mesembryanthemum*  
Ghost Plant—*Graptopetalum paraguayense* (*Echeveria weinbergii*)  
Giant Toad Plant—*Stapelia gigantea*  
Gingham Golf Ball—*Euphorbia obesa*  
Goat's Horns—*Cheiridopsis candidissima*  
Golden Sedum—*Sedum adolphii*  
Good Luck Plant—*Sanseveria*  
Green Roses—*Greenovia dodrentalis* (*G. gracilis*)  
Hairy Toad Plant—*Stapelia hirsuta*  
Hedgehog Aloe—*Aloe humilis*  
Hemp Plant—*Agave sisalana*  
Hen and Chickens—*Echeveria secunda-glauca*  
Houseleek—*Sempervivum*  
Ice Plant—*Mesembryanthemum cristallinum*  
Inch Worm—*Kleinia pendula*  
Jade Plant—*Crassula argentea*  
Joshua Tree—*Cleistoyucca brevifolia* (*arborescens*)  
Lamb's Tongue—*Agrinictus agninum*  
Little Pickles—*Otbonna crassifolia*

- Live Forever—*Sempervivum*  
Living Telegraph Pole—*Idria columnaris*  
Lobster Claws—*Cheiridopsis pillansii*  
Lord's Candle—*Hesperoyucca whipplei*  
Medusa Head—*Euphorbia caput-medusae*  
Mexican Love Plant—*Bryophyllum pinnatum*  
Mother-in-law's Tongue—*Gasteria*  
Necklace Vine—*Crassula rupestris* or *C. perforata*  
Ocotillo—*Fouquieria splendens*  
Our Lord's Candle—*Hesperoyucca whipplei*  
Pagoda Plant—*Crassula* sp.  
Painted Lady—*Echeveria derenbergii*  
Panda Plant—*Kalanchoe tomentosa*  
Partridge Breast—*Aloe variegata*  
Pen Wiper—*Kalanchoe marmorata*  
Plover Eggs—*Adromischus cooperi*  
Plush Plant—*Echeveria pulvinata*  
Pussy Ears—*Cyanotis somaliensis*  
Rosary Plant—*Crassula rupestris*  
Rosary Vine—*Ceropegia woodii*  
Sand Rose—*Anacampseros telephiastrum*  
Silver Beads—*Crassula deltoidea*  
Silverskin—*Argyroderma testiculare*  
Slipper Flower—*Pedilanthus macrocarpus*  
Soap Tree—*Yucca elata*  
Spanish Bayonet—*Yucca baccata*  
Spanish Dagger—*Yucca mojavenensis*  
Spiderweb Houseleek—*Sempervivum arachnoideum*  
Spoon Flower—*Dasylirion wheeleri*  
Sprouting Leaf—*Bryophyllum*  
Star Fish—*Stapelia*  
Stone Face—In the genera *Lithops*, *Lapidaria*, *Rimaria*, and *Argyroderma*  
Stonecrops—Members of the genus *Sedum*  
Tiger Jaw—*Faucaria tigrina* and other species  
Toad Plant—*Stapelia variegata*  
Tongue Leaf—*Glottiphyllum linguiforme*  
Totem Pole—*Idria columnaris*  
Torch Plant—*Aloe arborescens* or *spinosissima*  
Toy Cypress—*Crassula lycopodioides*  
Umbrella Flower—*Ceropegia woodii*  
Velvet Leaf—*Kalanchoe beharensis*  
Victory Plant—*Cheiridopsis candidissima*  
Wart Plant—Several species of *Haworthias*  
Windowed Plant—*Haworthia cymbiformis*

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